

Amendments to the Claims

Please cancel claims 140-145, and 1691-1718 without prejudice.

The following listing of claims will replace all prior versions and/or listings of claims in the application:

Listing of Claims:

1-120. (cancelled)

121. (previously presented): A method for treating a hydrocarbon containing formation, comprising:

providing heat from one or more heaters to at least a portion of the formation, wherein at least one of the heaters is in an uncased portion of a wellbore in the formation, wherein the uncased portion of the wellbore has been sized, at least in part, so that a minimum space between the heater and the formation is maintained after expansion of the formation in the wellbore caused by heating of the formation, and wherein the expansion of the formation in the wellbore is estimated based on the richness of one or more zones in the formation; and

allowing the heat to transfer from the one or more heaters to a part of the formation; and
producing a mixture from the formation.

122. (cancelled)

123. (previously presented): The method of claim 121, wherein the minimum space is at least about 0.5 cm.

124. (previously presented): The method of claim 121, wherein the minimum space is at least about 0.3 cm.

125. (previously presented): The method of claim 121, further comprising controlling the heating to maintain the minimum space between at least one of the heaters and the formation in at least one of the wellbores.

126. (original): The method of claim 121, further comprising controlling the heating using a temperature limited heater.

127. (cancelled)

128. (original): The method of claim 121, wherein a diameter of one or more of the sized wellbores is greater than or equal to about 30 cm.

129. (original): The method of claim 121, wherein one or more of the wellbores have an expanded diameter proximate to relatively rich zones in the formation.

130. (original): The method of claim 129, wherein one or more of the expanded diameters is greater than or equal to about 30 cm.

131. (original): The method of claim 129, wherein the relatively rich zones comprise a richness greater than about 0.15 L/kg.

132. (original): The method of claim 129, wherein the relatively rich zones comprise a richness greater than about 0.17 L/kg.

133. (original): The method of claim 121, further comprising adjusting a heat output of at least one of the heaters such that the heat output provided to relatively rich zones of the formation is less than the heat output provided to other zones of the formation.

134. (original): The method of claim 133, wherein the relatively rich zones comprise a richness greater than about 0.15 L/kg.

135. (original): The method of claim 121, further comprising adjusting a heat output of at least one of the heaters such that the heat output provided to relatively rich zones of the formation is less than about $\frac{1}{2}$ the heat output provided to other zones of the formation.

136. (original): The method of claim 121, further comprising reaming at least one of the wellbores after at least some heating of the formation from such wellbores.

137. (original): The method of claim 121, further comprising reaming at least one of the wellbores after at least some heating of the formation from such wellbores, and wherein the reaming is conducted to remove at least some hydrocarbon material that has expanded in such wellbores.

138. (original): The method of claim 121, further comprising removing at least one of the heaters from at least one of the wellbores, and then reaming at least one such wellbore.

139. (original): The method of claim 121, further comprising perforating one or more relatively rich zones in at least part of the formation to allow for expansion of at least one or more of the relatively rich zones during heating of the formation.

140-145. (cancelled)

146. (original): The method of claim 121, further comprising maintaining a temperature in at least a portion of the formation in a pyrolysis temperature range, with a lower pyrolysis temperature of about 250 °C and an upper pyrolysis temperature of about 400 °C.

147. (original): The method of claim 121, further comprising heating at least a part of the formation to substantially pyrolyze at least some hydrocarbons in the formation.

148. (original): The method of claim 121, further comprising controlling a pressure and a temperature in at least a part of the formation, wherein the pressure is controlled as a function of temperature, or the temperature is controlled as a function of pressure.

149. (previously presented): The method of claim 121, wherein allowing the heat to transfer from the one or more heaters to the part of the formation comprises transferring heat substantially by radiation.

150. (original): The method of claim 121, wherein the produced mixture comprises condensable hydrocarbons having an API gravity of at least about 25°.

151. (original): The method of claim 121, further comprising controlling a pressure in at least a majority of a part of the formation, wherein the controlled pressure is at least about 2.0 bars absolute.

152. (original): The method of claim 121, further comprising controlling formation conditions such that the produced mixture comprises a partial pressure of H₂ in the mixture greater than about 0.5 bars.

153. (original): The method of claim 121, wherein the formation comprises an oil shale formation.

154. (original): The method of claim 121, wherein the formation comprises a coal formation.

155-1718. (cancelled)

1719. (new): A method for treating an oil shale formation comprising:

providing heat from one or more heaters to at least a portion of the oil shale formation, wherein at least one of the heaters is in an uncased portion of a wellbore in the oil shale formation, wherein the uncased portion of the wellbore has been sized, at least in part, so that a

minimum space between the heater and the oil shale formation is maintained after expansion of the oil shale formation in the wellbore caused by heating of the oil shale formation, and wherein the expansion of the oil shale formation in the wellbore is estimated based on the richness of one or more zones in the oil shale formation; and

allowing the heat to transfer from the one or more heaters to a part of the oil shale formation; and

producing a mixture from the oil shale formation.

1720. (new): The method of claim 1719, wherein the minimum space is at least about 0.5 cm.

1721. (new): The method of claim 1719, wherein the minimum space is at least about 0.3 cm.

1722. (new): The method of claim 1719, further comprising controlling the heating to maintain the minimum space between at least one of the heaters and the oil shale formation in at least one of the wellbores.

1723. (new): The method of claim 1719, further comprising controlling the heating using a temperature limited heater.

1724. (new): The method of claim 1719, wherein a diameter of one or more of the sized wellbores is greater than or equal to about 30 cm.

1725. (new): The method of claim 1719, wherein one or more of the wellbores have an expanded diameter proximate to relatively rich zones in the formation.

1726. (new): The method of claim 1725, wherein one or more of the expanded diameters is greater than or equal to about 30 cm.

1727. (new): The method of claim 1725, wherein the relatively rich zones comprise a richness greater than about 0.15 L/kg.

1728. (new): The method of claim 1725, wherein the relatively rich zones comprise a richness greater than about 0.17 L/kg.

1729. (new): The method of claim 1719, further comprising adjusting a heat output of at least one of the heaters such that the heat output provided to relatively rich zones of the oil shale formation is less than the heat output provided to other zones of the oil shale formation.

1730. (new): The method of claim 1729, wherein the relatively rich zones comprise a richness greater than about 0.15 L/kg.

1731. (new): The method of claim 1719, further comprising adjusting a heat output of at least one of the heaters such that the heat output provided to relatively rich zones of the formation is less than about $\frac{1}{2}$ the heat output provided to other zones of the formation.

1732. (new): The method of claim 1719, further comprising reaming at least one of the wellbores after at least some heating of the oil shale formation from such wellbores.

1733. (new): The method of claim 1719, further comprising reaming at least one of the wellbores after at least some heating of the oil shale formation from such wellbores, and wherein the reaming is conducted to remove at least some hydrocarbon material that has expanded in such wellbores.

1734. (new): The method of claim 1719, further comprising removing at least one of the heaters from at least one of the wellbores, and then reaming at least one such wellbore.

1735. (new): The method of claim 1719, further comprising perforating one or more relatively rich zones in at least part of the formation to allow for expansion of at least one or more of the relatively rich zones during heating of the oil shale formation.

1736. (new): The method of claim 1719, further comprising maintaining a temperature in at least a portion of the oil shale formation in a pyrolysis temperature range, with a lower pyrolysis temperature of about 250 °C and an upper pyrolysis temperature of about 400 °C.

1737. (new): The method of claim 1719, further comprising heating at least a part of the oil shale formation to substantially pyrolyze at least some hydrocarbons in the formation.

1738. (new): The method of claim 1719, further comprising controlling a pressure and a temperature in at least a part of the formation, wherein the pressure is controlled as a function of temperature, or the temperature is controlled as a function of pressure.

1739. (new): The method of claim 1719, wherein allowing the heat to transfer from the one or more heaters to the part of the oil shale formation comprises transferring heat substantially by radiation.

1740. (new): The method of claim 1719, wherein the produced mixture comprises condensable hydrocarbons having an API gravity of at least about 25°.

1741. (new): The method of claim 1719, further comprising controlling a pressure in at least a majority of a part of the oil shale formation, wherein the controlled pressure is at least about 2.0 bars absolute.

1742. (new): The method of claim 1719, further comprising controlling formation conditions such that the produced mixture comprises a partial pressure of H₂ in the mixture greater than about 0.5 bars.

1743. (previously presented): A method for treating a coal formation, comprising:
providing heat from one or more heaters to at least a portion of the coal formation,
wherein at least one of the heaters is in an uncased portion of a wellbore in the coal formation,
wherein the uncased portion of the wellbore has been sized, at least in part, so that a minimum

space between the heater and the coal formation is maintained after expansion of the formation in the wellbore caused by heating of the coal formation, and wherein the expansion of the coal formation in the wellbore is estimated based on the richness of one or more zones in the coal formation; and

allowing the heat to transfer from the one or more heaters to a part of the coal formation;
and

producing a mixture from the coal formation.

1744. (new): The method of claim 1743, wherein the minimum space is at least about 0.5 cm.

1745. (new): The method of claim 1743, wherein the minimum space is at least about 0.3 cm.

1746. (new): The method of claim 1743, further comprising controlling the heating to maintain the minimum space between at least one of the heaters and the coal formation in at least one of the wellbores.

1747. (new): The method of claim 1743, further comprising controlling the heating using a temperature limited heater.

1748. (new): The method of claim 1743, wherein a diameter of one or more of the sized wellbores is greater than or equal to about 30 cm.

1749. (new): The method of claim 1743, wherein one or more of the wellbores have an expanded diameter proximate to relatively rich zones in the coal formation.

1750. (new): The method of claim 1749, wherein one or more of the expanded diameters is greater than or equal to about 30 cm.

1751. (new): The method of claim 1743, further comprising adjusting a heat output of at least one of the heaters such that the heat output provided to relatively rich zones of the coal formation is less than the heat output provided to other zones of the coal formation.

1752. (new): The method of claim 1743, further comprising adjusting a heat output of at least one of the heaters such that the heat output provided to relatively rich zones of the coal formation is less than about $\frac{1}{2}$ the heat output provided to other zones of the coal formation.

1753. (new): The method of claim 1743, further comprising reaming at least one of the wellbores after at least some heating of the coal formation from such wellbores.

1754. (new): The method of claim 1743, further comprising reaming at least one of the wellbores after at least some heating of the coal formation from such wellbores, and wherein the reaming is conducted to remove at least some hydrocarbon material that has expanded in such wellbores.

1755. (new): The method of claim 1743, further comprising removing at least one of the heaters from at least one of the wellbores, and then reaming at least one such wellbore.

1756. (new): The method of claim 1743, further comprising perforating one or more relatively rich zones in at least part of the coal formation to allow for expansion of at least one or more of the relatively rich zones during heating of the coal formation.

1757. (new): The method of claim 1743, further comprising maintaining a temperature in at least a portion of the coal formation in a pyrolysis temperature range, with a lower pyrolysis temperature of about 250 °C and an upper pyrolysis temperature of about 400 °C.

1758. (new): The method of claim 1743, further comprising heating at least a part of the coal formation to substantially pyrolyze at least some hydrocarbons in the coal formation.

1759. (new): The method of claim 1743, further comprising controlling a pressure and a temperature in at least a part of the coal formation, wherein the pressure is controlled as a function of temperature, or the temperature is controlled as a function of pressure.

1760. (new): The method of claim 1743, wherein allowing the heat to transfer from the one or more heaters to the part of the coal formation comprises transferring heat substantially by radiation.

1761. (new): The method of claim 1743, wherein the produced mixture comprises condensable hydrocarbons having an API gravity of at least about 25°.

1762. (new): The method of claim 1743, further comprising controlling a pressure in at least a majority of a part of the coal formation, wherein the controlled pressure is at least about 2.0 bars absolute.

1763. (new): The method of claim 1743, further comprising controlling formation conditions such that the produced mixture comprises a partial pressure of H₂ in the mixture greater than about 0.5 bars.